



অসম দক্ষতা বিশ্ববিদ্যালয়
ASSAM SKILL UNIVERSITY
(A Govt of Assam University)

Assam Skill University Entrance Examinations 2026
B.Tech. Program
MATHEMATICS (Paper No. : 02)

Full Marks : 40

Time : 50 minutes

Total number of pages in this booklet : 8

DO NOT OPEN THE QUESTION BOOKLET UNTIL YOU ARE INSTRUCTED

All candidates are required to read the instructions given below, before starting to write the answers. Ensure to write your ROLL CODE and ROLL NUMBER AT THE BOTTOM OF THIS PAGE.

Instructions

1. Candidate should keep his/her admit card on the table with his/her latest photograph pasted on it.
2. There are 40 MCQs of Mathematics in this Question Paper meant for applicants **for B.Tech.** (All Disciplines). All questions are compulsory. Use separate OMR for Mathematics
3. Each question carries 1 mark. There is no negative marking. **Full marks : 40.**
4. The answers are to be given by making proper marking on the **OMR with ball point Black pen** only in separate OMR sheets.
5. No loose sheet is allowed. Rough work, if required, may be done on the blank pages at the end of this question paper.
6. Talking with any other candidate inside the examination hall may lead to disqualification of the candidate.
7. **OMRs must be signed by the candidate and the invigilator. The candidate has to ensure the same, because lack of these signatures will lead to cancellation of the OMR.**
8. Candidate has to put his/her signature on the attendance sheet. **No candidate is allowed to leave the examination hall before completion of 1 (one) hour from the commencement of examination.**
9. Candidate needs to check the Question booklet after instructed by the invigilator and report if any discrepancies are noticed in the booklet regarding number of pages or damaged pages.
10. **Marking in more than one option against any question on the OMR will cancel that answer.** Instructions are given on the reverse of the OMRs.
11. If any applicant (Roll Code : BFT) wants to appear **in both Mathematics and Biology papers**, it may be allowed. The first OMR will be collected after 50 minutes and the second OMR and QP will be issued for the next subject and additional 50 minutes will be allowed. **Correct Roll Code is to be written on the concerned OMR.**
12. Handover the Question Paper and the OMR to the invigilator before leaving the exam hall.

Roll Code : Roll Number : Sl. No. of the OMR :

Signature of the candidate:.....

Mathematics

1. If $A = \{1, 2, 3\}$, what is the number of relations that can be defined on A ?
(A) 2^3 (B) 2^6
(C) 2^9 (D) 9^2
2. The function $f(x) = \sin(x)$ is one-one in which of the following intervals?
(A) $[0, \pi]$ (B) $[-\pi/2, \pi/2]$
(C) $[0, 2\pi]$ (D) $[-\pi, \pi]$
3. If $a + ib = \sqrt{i}$, find the value of $a^2 + b^2$:
(A) 0 (B) 1
(C) 2 (D) $1/2$
4. The nature of the roots of $x^2 + 4x + 5 = 0$ is:
(A) Real and equal (B) Real and unequal
(C) Complex conjugates (D) Rational
5. If A is a square matrix, then $A + A^T$ is always:
(A) Skew-symmetric (B) Symmetric
(C) Identity matrix (D) Null matrix
6. Find the value of ${}^nC_0 + {}^nC_n$:
(A) n (B) $2n$
(C) 2 (D) 0
7. The number of terms in the expansion of $(1 + 3x + 3x^2 + x^3)^{10}$ is:
(A) 11 (B) 31
(C) 30 (D) 10
8. If A.M. and G.M. of two numbers are 5 and 4 respectively, the numbers are:
(A) 2,8 (B) 4,6
(C) 1,9 (D) 5,5
9. Evaluate $\lim_{x \rightarrow 0} \frac{1 - \cos x}{x^2}$:
(A) 0 (B) 1
(C) $1/2$ (D) 2

10. If $y = \log(\sin x)$, find dy/dx :
- (A) $\tan x$ (B) $\cot x$
 (C) $\sec x$ (D) $\csc x$
11. The derivative of e^x with respect to \sqrt{x} is:
- (A) $2\sqrt{x}e^x$ (B) $e^x/(2\sqrt{x})$
 (C) e^x (D) 1
12. Evaluate $\int \frac{dx}{x \log x}$:
- (A) $\log x + C$ (B) $\log(\log x) + C$
 (C) $1/x + C$ (D) $(\log x)^2/2 + C$
13. The area of the region bounded by $y^2 = x$ and the lines $x = 1$, $x = 4$ in the first quadrant is:
- (A) $14/3$ (B) $7/3$
 (C) $3/14$ (D) 4
14. The degree of the differential equation $\frac{d^2y}{dx^2} + \sin\left(\frac{d^2y}{dx^2}\right) = 0$ is:
- (A) 1 (B) 2
 (C) Not defined (D) 0
15. The distance of the point $(3, -4, 5)$ from the yz -plane is:
- (A) 3 (B) 4
 (C) 5 (D) $\sqrt{50}$
16. If \vec{a} and \vec{b} are unit vectors and θ is the angle between them, then $|\vec{a} + \vec{b}|$ is:
- (A) $2 \cos(\theta/2)$ (B) $2 \sin(\theta/2)$
 (C) $\cos(\theta/2)$ (D) $\sin(\theta/2)$
17. The mean deviation about the mean for the data 3, 10, 10, 4, 7, 10, 5 is:
- (A) 2 (B) 2.57
 (C) 3 (D) 3.5

18. If $P(A) = 0.8$ and $P(B|A) = 0.4$, then $P(A \cap B)$ is:
- (A) 0.32 (B) 0.4
(C) 0.5 (D) 0.12
19. If the 3rd and 7th terms of an A.P. are 13 and 33 respectively, the common difference is:
- (A) 4 (B) 5
(C) 6 (D) 7
20. The radius of the circle $x^2 + y^2 - 4x - 6y - 12 = 0$ is:
- (A) 5 (B) 12
(C) $\sqrt{13}$ (D) 25
21. If $A = \{1, 2\}$ and $B = \{2, 3\}$, what is the power set of $(A \cap B)$?
- (A) $\{\emptyset, \{1\}, \{2\}\}$ (B) $\{\emptyset, \{2\}\}$
(C) $\{\emptyset, \{1, 2, 3\}\}$ (D) $\{\{2\}\}$
22. A relation R on a set A is an equivalence relation if it is:
- (A) Reflexive and Symmetric only
(B) Symmetric and Transitive only
(C) Reflexive, Symmetric, and Transitive
(D) One-one and onto
23. If $f(x) = x + 1$ and $g(x) = 2x$, find the composition $(g \circ f)(x)$:
- (A) $2x + 1$ (B) $2x + 2$
(C) $x + 2$ (D) $2x^2 + 1$
24. The modulus of the complex number $z = 3 + 4i$ is:
- (A) 7 (B) $\sqrt{7}$
(C) 5 (D) 25
25. If α and β are roots of $x^2 - 5x + 6 = 0$, then $\alpha + \beta$ is:
- (A) 5 (B) -5
(C) 6 (D) -6

26. The value of 5P_2 is:
- (A) 10 (B) 20
(C) 25 (D) 60
27. The number of ways to choose 2 colors from a set of 4 is
- (A) 6 (B) 12
(C) 8 (D) 4
28. The middle term in the expansion of $(x + a)^4$ is:
- (A) a^4 (B) $4a^3x$
(C) $6a^2x^2$ (D) $4ax^3$
29. The Geometric Mean (G.M.) between 4 and 16 is:
- (A) 10 (B) 8
(C) 6 (D) 12
30. Evaluate $\lim_{x \rightarrow 3} \frac{x^2 - 9}{x - 3}$:
- (A) 0 (B) 3
(C) 6 (D) ∞
31. The derivative of $\sin(x^2)$ with respect to x is:
- (A) $\cos(x^2)$ (B) $2x \cos(x^2)$
(C) $2\sin(x)$ (D) $-2x \cos(x^2)$
32. If $y = e^{2x}$, then $\frac{d^2y}{dx^2}$ is:
- (A) $2e^{2x}$ (B) $4e^{2x}$
(C) e^{2x} (D) $4xe^{2x}$
33. Evaluate the definite integral $\int_0^{\frac{\pi}{2}} \frac{\sin x}{\sin x + \cos x} dx$.
- (A) π (B) $\pi/2$
(C) $\pi/4$ (D) $\pi/3$

34. The order of the differential equation $\frac{d^2y}{dx^2} + \left(\frac{dy}{dx}\right)^3 = 0$ is:
- (A) 1 (B) 2
(C) 3 (D) 0
35. The distance between points (0, 0) and (3, 4) is:
- (A) 5 (B) 7
(C) 25 (D) $\sqrt{7}$
36. Two lines with slopes m_1 and m_2 are perpendicular if:
- (A) $m_1 = m_2$ (B) $m_1 m_2 = 1$
(C) $m_1 m_2 = -1$ (D) $m_1 + m_2 = 0$
37. The eccentricity of a circle is:
- (A) 1 (B) 0
(C) Greater than 1 (D) Between 0 and 1
38. If direction cosines of a line are l, m, n , then $l^2 + m^2 + n^2$ is:
- (A) 0 (B) 1
(C) -1 (D) 2
39. The magnitude of vector $\vec{a} = \hat{i} + \hat{j} + \hat{k}$ is:
- (A) 1 (B) 3
(C) $\sqrt{3}$ (D) 0
40. The relationship between Variance (σ^2) and Standard Deviation (σ) is:
- (A) Variance = $\sqrt{\text{SD}}$ (B) SD = $\sqrt{\text{Variance}}$
(C) Variance = $2 \times \text{SD}$ (D) SD = Variance²
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SPACE FOR ROUGH WORK (IF REQUIRED)